

INNOVATION BY THE BREAKTHROUGH THINKING — BREAKTHROUGH MIND METHODS

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ABSTRACT

This approach that creates a significantly higher level of reform plans compared with the current level introduces the policy identification step at the beginning of VE activities.

INTRODUCTION

Companies are surrounded with the severest environment they have ever experienced. During the boom of the "bubble economy," some industries raised product/service prices by adding functions which were not needed by customers but were intended to stir up consumption to make profits. In such a severe business environment, however, companies are required to improve real values and make a reform. For this purpose, it is necessary to eliminate the development of insubstantial customer needs using superficial marketing techniques and user analyses, systematize in approach to create customer oriented products/services through creative approaches to achieve success.

WHAT IS THE BREAKTHROUGH THINKING?

The breakthrough thinking, systematized by Gerald Nadler and Shozo Hibino, is a way of thinking to make drastic changes or reforms in current situations, breaking from the conventional way of thinking based on the thoughts of Descartes and Kant which have been the

mainstream for nearly 350 years. The breakthrough thinking methods specify seven principles as below to break the status quo.

In conventional ways of thinking, the problem solving approach is to itemize the theme, analyze the current status of each item, and find the best solutions for each. On the other hand, the breakthrough thinking takes an approach to redefine the theme itself by understanding it from a broad outlook. The seven principles help this approach.

Structure of the Breakthrough Mind Methods (B.T.M. Methods)¹

The B.T.M. methods are a problem-solving approach consisting of systematized seven principles. The procedure and structure of the method are shown in Tables 1 and 2.

With this approach, first clarify the dream or desire by (1) "identifying the desire," then (2) "identify high level objectives" to reach the desire. Although you may draw out ideas at this stage from the high level objectives (functions in a broad sense), it will be difficult to draw out new ideas since they are significantly different from the original image of the theme. This is because the level of values (a person's sense of value, level of the objective to be solved) in understanding the theme to materialize new high level objectives is not clear.

Principals

Seven Principles for Breakthrough

- (1) The Solution-after-Next Principle
- (2) The Purposes Principle
- (3) The Uniqueness Principle
- (4) The Systems Principle
- (5) The Limited Information Collection Principle
- (6) The People Design Principle
- (7) The Bellorment Timeline Principle

TABLE 2

Then, (3) "create values in the objectives." In process (3), compare the values in the conventional methods with the new values in the high level objectives to obtain ideas and hints which fill up the gap between them (this is the area called "warming up" in creative engineering). (4) "establish the high level objective." In this process, the level of high level objectives to be dealt with is determined.

Since the steps up to now are conceptual (structured in one's mind), it is difficult to draw out ideas as there are no reform images at this stage. Therefore, first collect information regarding current situations keeping in mind the high level objective. In this process of (5) "understanding current situations," collect external environmental information (opportunity, threat) and internal environmental information (strong point [ability], weak point [problem]) relating to the desire and the high level objective. In the next step (6) "creating reform images," make an image of the scenario described on the next page based on information at the apexes of the triangle (this is called the "information triangle") to determine the

direction of the improvement and the range of the activity theme.

Activity members examine the scenario to redefine the new theme, and then (7) "establish the goal." While a goal is established before starting activities in many of the conventional methods, such activities with a premise of breaking the status quo require clear theme at this stage.

CONCRETE APPROACH POINTS FOR NEW PRODUCT DEVELOPMENT

There are three points: identify the desire (step 1), identify objectives (steps 2-4), and identify new values (steps 5-7). Activities for each point are described as follows.

(1) Identifying the desire

Image the dream and ideal for the theme as much as possible. Then, classify these desires into high, middle, and low levels (See Table 3).

Table 3: Identifying the Desire

High level	Development of a maintenance-free system
Middle level	Development of monitoring system for safe operation
Low level	Review and improvement of the existing system

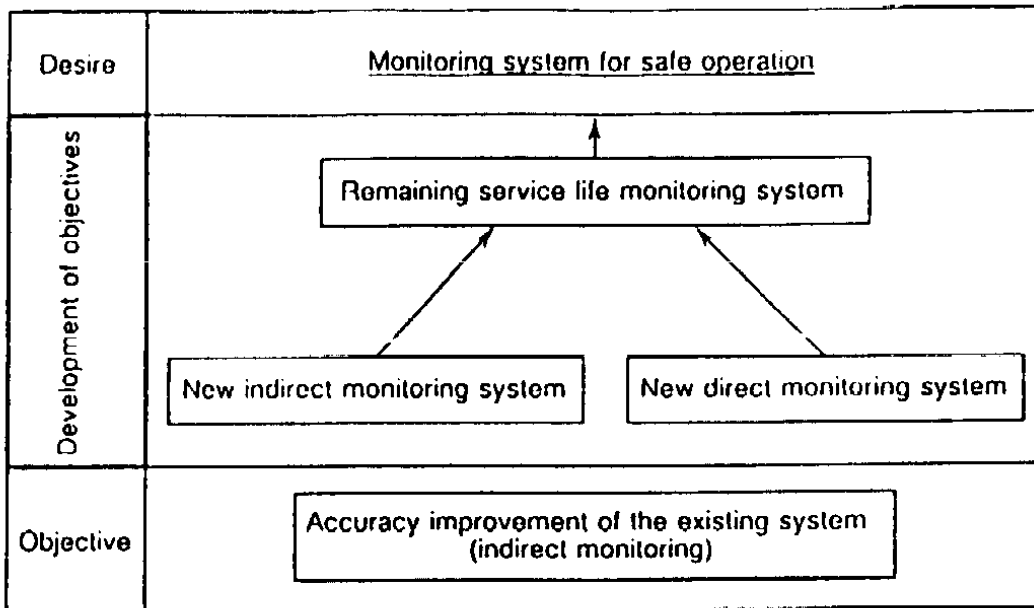
The high level desire means that the process and method to materialize it are unknown at the present stage. On the other hand, the low level desire mean that the process and method can be expected although such process and method have not been used for the same theme. The

following tables show the development of the safety monitoring system in a plant as an example.

(2) Identifying objectives

Clarify high level desires as far as possible, identify the objective to materialize the desire, and determine the level of the objective.

Table 4: Developing Objectives



First, extract high level objectives that are positioned between the desire and the current objective (See Table (4)).

	Identifying high level objectives	<u>Creating values in the objectives</u>
Established	Remaining service life monitoring system	Eliminates the need for overhaul inspection and enables easy facility planning for the plant as a whole
	New direct (rotor vane) monitoring system	Prevents mechanical troubles in the plant
	New indirect (dust) monitoring system	Measures the characteristics of dust (size, concentration, etc.)
Current status	Accuracy improvement of the existing system	Improves reliability (durability, accuracy, measuring range, antinoise, etc.)

Table 5: Creating Values in Objective

Then, clarify the framework (values) to implement each objective (See Table 5).

Determine the direction of the improvement in accordance with the scenario described in Section 3 (See Table 6).

(3) Identifying new values

Goal	<p>(1) Desire: Development of a monitoring system for safe operation</p>	
	<p>(2) Objective: New direct monitoring system</p>	
<p>⑤ Understand current situations</p>	<p>Opportunity</p> <ul style="list-style-type: none"> • Trend of energy conservation • Other companies' systems under development 	<p>Threat</p> <ul style="list-style-type: none"> • It takes time for customers attaching great importance on safety to accept new proposals.
	<p>Ability</p> <ul style="list-style-type: none"> • Top plant supplier in the industry 	<p>Problems</p> <ul style="list-style-type: none"> • Accuracy and production cost are in an inverse relation • Large cost in the testing for higher accuracy
<p>⑥ Create reform images</p>	<p>Confirm the safety by monitoring the mechanical changes in the shape of the rotor vane directly.</p>	
<p>⑦ Establish the goal</p>	<ul style="list-style-type: none"> • Check the shape of the rotor vane (Check of dimensions, weight, and worn areas). 	

Table 6: Identifying Values

(4) Should all of the seven steps (1-7) be used?

EVALUATION OF PRACTICAL CASES

Choose one of step combination patterns (simple, basic or full-scale) according to the content of the theme.

The Breakthrough Mind Methods have been applied to 107 cases: 89 cases of hardware development and 18

cases of software development (including management system development). Approximately 30% of hardware development cases and approximately 60% of software development cases have shown higher innovation in the developed products/systems than those resulting from conventional approaches.

It is also shown that this approach is more effective on software development than on hardware development.

CONCLUSION

Many companies that are enhancing restructuring are required to break the status quo in solving problems and are groping for new solutions. However, they are still using approaches by analyzing current situations. To break the status quo, it will be more effective to take the approach to materialize desires not being bound by current situations.

References

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2. Gerald Nadler, Shozo Hibino, *Breakthrough Thinking*, Prima Publishing & Communications, California, U.S.A. 1990